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EXAMINER

WARE, CICELY Q

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| ART UNIT | PAPER NUMBER |
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2634

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|-----------------|-----------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/046,444 | TRIPATHI ET AL. | |
| | Examiner | Art Unit | |
| | Cicely Ware | 2634 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5, 7, 8, 10-13, 15, 16, 18-21, 23 is/are rejected.
- 7) ☒ Claim(s) 2, 4, 6, 9, 14, 17, 22 and 24-30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date 2. | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to because:

a. Fig. 1, applicant makes reference to an element (27), pg. 9, line 2.

Examiner suggests applicant number the respective element for clarification purposes.

b. Fig. 1, examiner suggests applicant insert the directional arrows for the elements 24 to 26 for clarification purposes.

c. Fig. 1, element 25, applicant discloses that element 25 produces the soft estimates are computed through and then transferred to element 16. Element 25 does not have an output. Examiner suggests applicant use the correct directional flow output arrow for element 25 for clarification purposes.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

3. Claims 15 and 16 are objected to because of the following informalities:

a. Claim 15, line 2, applicant uses the phrase "first feed-forward filters".

Examiner suggests using "first feed-forward filter filters" for clarification purposes.

b. Claim 16, line 3, applicant uses the phrase "of the plurality of sample through". Examiner suggests using "of the plurality of samples through" for clarification purposes.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

5. Claims 18-20 recite the limitation "said first output" in claim 18. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 3 are rejected under 35 U.S.C. 102(e) as being anticipated by De (US Patent 6,563,812).

(1) With regard to claim 1, De discloses in (Fig. 3) a method for decoding a packet transmitted over a channel, the packet including a plurality of samples (col. 3, lines 33-34), said method comprising: generating a first set of soft estimates (205, $b_l(k)$) of bits based upon a computation of a first feed-forward filter (202, FFI) and a first feedback filter (204, BFI) as a function of an estimate of the channel (col. 4, lines 48-66, col. 5, lines 1-4); and generating a second set of soft estimates of bits (205, $b_k(k)$) based upon computation of a second feed-forward filter (202, FFK) and a second feedback filter (204, BFK) as a function of a first set of soft symbol estimates (205, BFI).

(3) With regard to claim 3, see rejection of claim 1.

8. Claims 5, 7, 8, 13, 15, 16, 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Agazzi et al. (US Patent 6,201,796).

(1) With regard to claim 5, Agazzi et al. discloses in (Figs 7 and 8) a method for decoding a packet transmitted over a channel, the packet including a plurality of samples (Fig. 7 (42)) (col. 7, lines 66-67, col. 8, lines 1-10), said method comprising: providing a first set of soft symbol estimates (Fig. 7 (52)); and computing a first feed-forward filter (Fig. 7 (46, 60)) and a first feedback filter (Fig. 8 (100)) as a function of the first set of soft symbol estimates (Fig. 7 (52)) (col. 9, lines 28-41).

(2) With regard to claim 7, claim 7 inherits all the limitations of claim 5. Agazzi et al. further discloses in (Figs. 7 and 8) filtering the plurality of samples (Fig. 7 (42)) through the first feed-forward filter (Fig. 7 (46)); and filtering the first set of soft symbol estimates through the first feedback filter (Fig. 7 (52, 60), Fig. 8 (100)) (col. 9, lines 28-41).

(3) With regard to claim 8, claim 8 inherits all the limitations of claim 7. Agazzi et al. further discloses in (Figs. 7 and 8) providing a first set of decision feedback equalization outputs (Fig. 8 (58)) in response to a filtering of the plurality of samples (Fig. 7 (42)) through the first feed-forward filter (Fig. 7 (46)) and a filtering of the first set of soft symbol estimates (Fig. 7 (52)) through the first feedback filter (Fig. 7 (60), Fig. 8 (58, 100)) (col. 9, lines 11-15, 28-41).

(4) With regard to claim 13, Agazzi et al. further discloses in (Figs. 7 and 8) a device for decoding a packet transmitted over a channel, the packet including a plurality of samples, said device comprising: a soft symbol estimator (Fig. 7 (46)) providing a first

set of soft symbol estimates (Fig. 7 (52)) in response to a reception of the packet by said device; a first feed-forward filter (Fig. 7 (46)) computed as a function of the first set of soft symbol estimates (Fig. 7 (52)); and a first feedback filter (Fig. 7 (60), Fig. 8 (58, 100)) computed as a function of the first set of soft symbol estimates (Fig. 7 (52)) (col. 9, lines 11-15, 28-41).

(5) With regard to claim 15, claim 15 inherits all the limitations of claim 13. Agazzi et al. further discloses in (Figs. 7 and 8) said feed-forward filter filters (Fig. 7 (46)) the plurality of samples (Fig. 7 (42)) upon a computation of said first feed-forward filter; and said feedback filter filters (Fig. 7 (60), Fig. 8 (58, 100)) the first set of soft symbol estimates (Fig. 7 (52)) upon a computation of said first feedback filter (Fig. 7 (60), Fig. 8 (100)) (col. 8, lines 4-10, col. 9, lines 11-15, 28-41).

(6) With regard to claim 16, claim 16 inherits all the limitations of claim 15. Agazzi et al. further discloses in (Figs. 7 and 8) an adder (Fig. 8 (102)) providing a first set of decision feedback equalization outputs (Fig. 7 (60), Fig. 8 (58)) in response to a filtering of the plurality of samples (Fig. 7 (42)) through said first feed-forward filter (Fig. 7(46)) and a filtering of the first set of soft symbol estimates (Fig. 7 (52)) through said first feedback filter (Fig. 7 (60), Fig. 8 (58, 100)).

(7) With regard to claim 23, see rejection of claim 5. Agazzi further discloses a computer readable medium storing a computer program (col. 1, lines 15-23).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 10-12, 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Agazzi et al. (US Patent 6,201,796) as applied to claims 1, 8, 16, in view of De (US Patent 6,563,812).

(1) With regard to claim 10, claim 10 inherits all the limitations of claim 8. Agazzi et al. does not disclose all the limitations of claim 8. However Agazzi et al. does not disclose providing a second set of soft symbol estimates; and computing a second feed-forward filter and a second feedback filter as a function of the second set of soft symbol estimates.

However De discloses in (Fig. 3) providing a second set of soft symbol estimates (205, $b_L(k)$); and computing a second feed-forward filter (202, FFK) and a second feedback filter (204, BFK) as a function of the second set of soft symbol estimates (205, $b_k(k)$).

Therefore it would have been obvious to one of ordinary skill in the art to modify Agazzi et al. to providing a second set of soft symbol estimates; and computing a second feed-forward filter and a second feedback filter as a function of the second set of soft symbol estimates in order to reduce steady state mean squared error at the

output of the receiver and faster convergence speed and detect signals received from a greater number of transmitters (De, col. 4, lines 34-38).

(2) With regard to claim 11, claim 11 inherits all the limitations of claim 10. De discloses in (Fig. 3) filtering the plurality of samples through the second feed-forward filter (202, FFK); and filtering the second set of soft symbol estimates (205, $b_k(k)$) through the second feedback filter (204, BFK).

(3) With regard to claim 12, claim 12 inherits all the limitations of claim 11. De discloses in (Fig. 3) providing a second set of decision feedback equalization outputs in response to a filtering of the plurality of samples through the second feed-forward filter (202, FFK) and a filtering of the second set of soft symbol estimates (205, $b_k(k)$) through the second feedback filter (204, BFK).

(4) With regard to claim 21, see rejection of claim 1. Agazzi further discloses a computer readable medium storing a computer program (col. 1, lines 15-23).

Allowable Subject Matter

11. Claims 2, 4, 6, 9, 14, 17, 22, 24-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: The instant application discloses a method for decoding a packet transmitter over a channel. Prior art references show similar methods but fail to teach: **“generating a set of hard estimates of bits based upon a computation of a third feed-forward filter and third**

feedback filter as a function of a second set of soft symbol estimates”, as in claims 2, 4, 22; “wherein the first feed-forward filter and the first feedback filter are computed according to: $\mathbf{x} = [\mathbf{y}(i) \mathbf{s}^{\wedge}(n)(i)] [\mathbf{f}(n) \mathbf{b}(n)] = \mathbf{R}_{xx}^{-1} \mathbf{R}_{xs}^{\wedge}(n)$, where $\mathbf{R}_{xx} = \mathbf{I} = 0 \text{ M} - 1 \mathbf{x}(i) \mathbf{x} \mathbf{H}(i) \mathbf{R}_{xs}^{\wedge}(n) = \mathbf{I} = 0 \text{ M} - 1 \mathbf{x}(i) (\mathbf{s}^{\wedge}(n)(i))^*$ ”, as in claims 6, 14, 24; “wherein the a first set of decision feedback equalization outputs are computed according to: $\mathbf{z}.\text{sup.}(n)(i) = (\mathbf{f}.\text{sup.}(n)). - \text{sup.} \mathbf{H}_y(i) + (\mathbf{b}.\text{sup.}(n)).\text{sup.} \mathbf{H}.\text{sup.}(n)(i)$ ”, as in claims 9, 17, 27; “providing a second set of soft symbol estimates; and computing a second feed-forward filter and a second feedback filter as a function of the second set of soft symbol estimates”, as in claim 28; “filtering the plurality of samples through the second feed-forward filter; and filtering the second set of soft symbol estimates through the second feedback filter”, as in claim 29; “providing a second set of decision feedback equalization outputs in response to a filtering of the plurality of samples through the second feed-forward filter and a filtering of the second set of soft symbol estimates through the second feedback filter”, as in claim 30; “computer readable code for filtering the plurality of samples through the first feed-forward filter; and computer readable code for filtering the first set of soft symbol estimates through the first feedback filter”, as in claim 25; “computer readable code for providing a first set of decision feedback equalization outputs in response to a filtering of the plurality of samples through the first feed-forward filter and a filtering of the first set of soft symbol estimates through the first feedback filter”, as in claim 26;

Art Unit: 2634

Conclusion

12. The prior art made record of and not relied upon is considered pertinent to applicant's disclosure:

a. Sommer et al., US Patent 6,240,133, discloses a high stability fast tracking adaptive equalizer for use with time varying communication channels.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cicely Ware whose telephone number is 571-272-3047. The examiner can normally be reached on Monday – Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Cicely Ware

cqw
August 6, 2005


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